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Lasius platythorax n. sp., a Widespread Sibling Species of Lasius niger (Hymenoptera: Formicidae)

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The ants known as *"Lasius niger"* consist of 2 clearly different biospecies in Central Europe and S Sweden. *Lasius niger* (Linnaeus 1758) is redescribed on the basis of 132 nest samples; a ☿ specimen from S Sweden is determined as neotype. *Lasius platythorax* n. sp. is described as new on the basis of 134 nest samples. The morphological differences of *Lasius niger* and *platythorax* n. sp. are very distinct throughout the studied territories. Using character combinations of weighted pronotal and gular hair length and clypeal pubescence distance in the ☿ and of relative mesosoma height and clypeal pubescence distance in the ♀, it was possible to determine each individual in the whole material. *L. niger* and *platythorax* are both widely distributed, but there is a very strong habitat segregation in Central Europe. *L. niger* prefers moderately xerothermous cultural habitats and has a strong synanthropic trend. *L. platythorax* is characteristic for different kinds of woodland, bogs and fens and avoids urban habitats. At the rare spots of syntopic occurrence, clear differences in the mode of nest construction are observed: *L. niger* is preferentially a digger and above-ground constructor with mineralic soil particles, while *L. platythorax* is more an excavator of various preformed organic spaces. *L. niger* may reach much higher nest densities than *platythorax* and prefers habitats with lower soil moisture. There is no evidence that the Palaearctic taxa *alienoniger, grandis, transylvanica, flavescens, emeryi, nitidus, nigrescens, pilicornis, minimus, sakagamii, hayashi, japonicus* and *coloratus* could be synonyms of *platythorax* n. sp.

Key words: Hymenoptera: Formicidae: Lasius — ant taxonomy — sibling species — habitat selection.

Seifert, B. [Mus. Naturk., O-8900 Görlitz, BR Deutschland]: **Lasius platythorax n. sp., eine europäische Zwillingsart von Lasius niger (Hymenoptera: Formicidae).** — Entomol. Gener. 16 (1): 069–081; Stuttgart 1991. — [Abhandlung].

Die bisher unter dem Namen *„Lasius niger"* bekannten Ameisen bestehen in Mitteleuropa und Südskandinavien aus 2 Arten. *Lasius niger* (Linnaeus 1758) wird auf der Basis von 132 Nestproben morphologisch und ökologisch beschrieben; eine ☿ aus Südschweden wird als Neotypus bestimmt. *Lasius platythorax* n. sp. wird auf der Basis von 134 Nestproben neu beschrieben. Die morphologischen Unterschiede zwischen *niger* und *platythorax* sind im gesamten untersuchten Territorium sehr deutlich. Unter Nutzung von Merkmalskombinationen aus gewogenen Haarlängen des Pronotum und der Caput-Unterseite sowie aus Pubeszenzabständen auf dem Clypeus bei ☿☿ bzw relativen Mesosoma-Höhen und clypealen Pubeszenz-Abständen bei ♀♀ ist die Bestimmung jedes Individuums im Gesamtmaterial möglich. Sowohl *niger* als auch *platythorax* sind weit verbreitet; in Mitteleuropa liegt eine deutliche Habitatsegregation vor. *L. niger* bevorzugt relativ warme, kulturell geprägte Habitate und zeigt einen starken synanthropen

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Trend. *L. platythorax* ist typisch für Waldland und Moore und meidet urbane Habitate. An den seltenen Plätzen syntopen Vorkommens sind deutliche Unterschiede in der Nestanlage vorhanden: *L. niger* zeigt typischerweise oberirdische Konstruktionen aus mineralischen Bodenpartikeln, während *platythorax* bereits vorhandene organische Strukturen aushöhlt. *L. niger* kann wesentlich höhere Nestdichten als *platythorax* erreichen und bevorzugt Habitate mit geringerer Bodenfeuchte. Es gibt keine Hinweise, daß die paläarktischen Taxa *alienoniger, grandis, transylvanica, flavescens, emeryi, nitidus, nigrescens, pilicornis, minimus, sakagamii, hayashi, japonicus* und *coloratus* Synonyme von *platythorax* n. sp. sein könnten.

1 Introduction

"F. tota nigra nitida, tibiis cinerascentibus" — this is the original description of an ant named *Formica nigra* Linnaeus 1758 which has been referred up to the present to those uniformly blackish brown European ants of the genus *Lasius* having many standing hairs on scapus and tibiae. According to Barry Bolton/BMNH London (pers comm Oct 1989), a search in the collection of the Linnean Society London revealed that types of *Formica nigra* were no longer present (if they had existed at all).

Suspicion that there are 2 species referable to as *"Lasius niger"* in Central Europe came up several years ago when it became clear that 2 distinct morphological types of ♀♀ are in existence: one with a rather flat and the other with a very high mesosoma [alitrunk][1]. In 1989, a more thorough study of this phenomenon was made. Surprisingly, the separation of the female castes is easy compared to the difficult problems which often were encountered in *Lasius* identification. Further, the 2 forms prove to be very different in habitat selection and behaviour, indicating that 2 different biospecies are involved rather than 2 morphs of a single species.

From the poor description of Linnaeus, no morphological argument can be derived to decide which ant 'his' *Formica nigra* might have been. There is no geographical indication, since each of the 2 species is widely distributed both in Central Europe and S' Sweden north to Uppland (the putative terra typica). The need to fix a neotype for *Lasius niger* (Linnaeus 1758) can thus be solved only in an arbitrary way. However, it makes sense to designate a neotype in that of the 2 species which (a): is distributed in cities, villages, gardens, arable land, meadows and other open, dry to mesophilic places, and (b) builds diverse, eye-catching constructions with mineralic soil, and (c) may develop very dense populations. This species certainly has a higher probability of being collected or of being the object of biological investigations. The other species, *Lasius platythorax* n. sp., is as widely distributed as *niger*. However, its habitats differ clearly: (a) its populations are on average less dense, and (b) its nesting places are more concealed. In Central European ant collections, a ratio of about 25–30 % *platythorax* n. sp. is found while 70–75 % belong to *niger*.

2 Investigation methods and terminology

The investigation methods and terminology of numerically described characters are as given elsewhere [Seifert 1988a, 1988b]. Here a shorter explanation is presented:

AH — alitrunk [≠ mesosoma] height measured perpendicularly to tangent of dorsal alitrunk profile from scutellum down to lower margin of mesopleura (Fig 1)

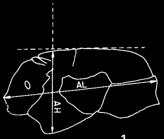
AL — maximum alitrunk [≠ mesosoma] length from hind median extension of propodeum to frontal profile of pronotum (Fig 1)

HL — maximum head [caput] length in median line

HW — maximum head [caput] width, measured across eyes or head capsule slightly behind eyes without pubescence

SL — maximum straight line scapus length excluding articular bulb

Fig 1: Mode of measuring alitrunk [≠ mesosoma] length AL, and alitrunk [≠ mesosoma] height AH, in ♀♀ of *Lasius* spp. [Hymenoptera: Formicidae].



PDCL — average pubescence distance on clypeus; the number n of pubescence hairs crossing or touching a measuring line of length l (arrow in Fig 4) is counted. PDCL is then l/n and given in µm.

UHL — length of longest hair on underside of head [caput]

PNHL — length of longest hair on pronotum

nHS — number of hairs on dorsal profile of scapus projecting more than 20 µm from cuticular surface

nHHT — number of hairs on extensor profile of hind tibia [tibia of pedes-III] projecting more than 20 µm from cuticular surface.

All metric values are uniformly given in µm.

The ♂♂ of the 2 species are not considered in this paper. At the first look, no striking difference between *niger* and *platythorax* n. sp. ♂♂ can be noted.

3 Evaluation of the 2 species

3.1 Reevaluation of Lasius niger (Linnaeus 1758)

3.1.1 Neotype designation

A neotype for *Formica nigra* Linnaeus 1758 was designated in a ☿ specimen from S Sweden labelled "S:B1. Johannishus 1 km NE k:a, RN-03F6f03, 10.08.74, P. Douwes DATA ZOOTAX" and "Neotype Formica nigra Linné, 1758, det. Seifert 1990". The neotype has the following measurements: HL 1099, HW 1064, SL 1028. The specimen is stored in the collection of the Zoologiska Museet, Lunds Universitet/Sverige.

3.1.2 Material

The redescription is based on a total of 132 samples with 272 ☿☿ and 123 ♀♀ originating from following territories:

S Sweden:	8 samples =	19 ☿☿, 5 ♀♀.
E Germany:	93 samples =	144 ☿☿, 28 ♀♀.
Czechoslovakia:	20 samples =	98 ☿☿, 89 ♀♀.
S Poland:	10 samples =	10 ☿☿, 1 ♀.
Hungary:	1 sample =	1 ☿.

3.1.3 Description

☿ (Fig 5, 8): caput longer than in *platythorax* n. sp.; ratio HL/HW on average 1.060 and significantly reducing with growing caput size, being 1.040 for HL = 1120 and 1.090 for HL = 800. This highly signifi-

cant allometry can be described by the function: HL/HW = −0.00015603 HL + 1.2142 (r = −0.4700, n = 118).
Occipital margin of caput, in the position where maximum HL is measured, weakly excavated to straight. Clypeus compared to *platythorax* normally with a less clear carina, more bowed profile and more vaulted surfaces. Dorsal profile line of alitrunk higher, more curved and with steeper dorsal dome of propodeum compared to *platythorax* (Fig 7, 8); this average difference is not always reliable for distinction. Dorsal crest of petiolar scale in frontal view straight or faintly emarginated. Pubescence on whole body surface dense, giving a less shining, more silky surface appearance compared to *platythorax*; the pubescence hairs are decumbent and, on frons of caput, 22–35 µm long; the shorter pubescence interspaces are most clearly expressed by PDCL being less than 19 µm in 93 % of all measured ☿☿. All surfaces of caput and gaster, dorsum of mesosoma, scapus, coxae, all tibiae and femora with erect to suberect hairs which are on average shorter than in *platythorax*. PNHL and UHL showed isometric growth in a regression against HL; means of UHL/HL and PNHL/HL are 0.083 and 0.119. Caput and gaster uniformly blackish brown; mesosoma and pedes frequently (but not always!) somewhat paler coloured, scapus light brown. The mesosoma colour is never as light as in Central European *Lasius emarginatus* and does not have the characteristic reddish tinge of *emarginatus*. The numeric data on morphology do not show notable geographic deviations and are presented in Tab 1.

Tab 1: Morphometric data of ☿☿ of *Lasius platythorax* n. sp., *L. niger* (Linnaeus 1758) and *L. emarginatus* (Olivier 1791) from S Sweden, E Germany, S Poland and Czechoslovakia [Hymenoptera: Formicidae].

Arrangement of data			arithmetic mean / standard deviation		(lower extreme-upper extreme) / number of examined specimens	
	Lasius platythorax n. sp.		*Lasius niger*		*Lasius emarginatus*	
HL	979.7	(699–1120)	974.2	(718–1118)	990.3	(874–1153)
	73.3	155	72.4	175	79.1	31
HL/HW	1.036	(0.991–1.093)	1.060	(1.005–1.106)	1.070	(1.024–1.109)
	0.0225	113	0.0212	118	0.0225	31
SL/HL	0.951	(0.911–1.006)	0.937	(0.890–0.984)	1.006	(0.954–1.053)
	0.0205	68	0.0216	73	0.0205	31
SL/HW	0.986	(0.918–1.076)	0.993	(0.935–1.068)	1.077	(1.009–1.118)
	0.0338	68	0.0292	72	0.0340	31
PDCL	26.25	(17.0–43.3)	13.41	(9.2–23.5)	27.32	(16.2–44.7)
	6.17	113	2.93	116	6.50	31
nHS	20.31	(8–32)	15.11	(7–23)	11.30	(4–26)
	5.47	68	3.38	73	6.40	31
nHHT	23.19	(8–35)	17.06	(10–26)	23.68	(14–34)
	5.85	68	3.72	73	5.14	31
UHL/HL	0.1302	(0.111–0.148)	0.0833	(0.063–0.125)	0.1200	(0.104–0.136)
	0.0087	113	0.0103	119	0.0085	31
PNHL/HL	0.1588	(0.131–0.180)	0.1190	(0.095–0.145)	0.1345	(0.103–0.157)
	0.0103	112	0.0085	119	0.0123	31

♀ (Fig 2, 9): Pubescence on caput and mesosoma subdecumbent and dense; the smaller interspaces between pubescence hairs compared to *platythorax* are best demonstrated with PDCL which is smaller than 14.7 µm. All surfaces of caput, dorsum of mesosoma, whole surface of gaster, coxae, femora, tibiae and scapus with numerous suberect to erect hairs which are in all positions distinctly shorter than in *platythorax*. Petiolus scale more or less deeply emarginated. Mesosoma very strong, clearly higher than in *platythorax*; ratio AH/AL in 99 % of specimens > 0.561 (compare Fig 2 and 3). HW, AL and other absolute measurements on average larger than in *platythorax*. Morphological data are given in Tab 2. Colour of all body parts blackish brown; scapus and pedes paler.

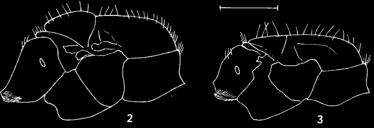


Fig 2–3: Lateral view of the mesosoma in ♀♀ of *Lasius* species. — 2 *Lasius niger* (Linnaeus 1758), 3 *Lasius platythorax* n. sp. (scale bar equals 1 mm) [Hymenoptera: Formicidae].

3.2 Introduction of Lasius platythorax n. sp.

3.2.1 Material

Holotypus: a ☿ example from Germany labelled "Oberlausitz, 1 km N' Biesig bei Reichenbach, 16.4.88, leg. Seifert" and stored in collection of Staatliches Museum für Naturkunde Görlitz (SMNG).

The description is based on a total of 134 samples with 212 ☿☿ and 66 ♀♀ originating from following territories:

S Sweden	7 samples:	13 ☿☿, 4 ♀♀
E Germany	117 samples:	159 ☿☿, 34 ♀♀
Czechoslovakia	7 samples:	32 ☿☿, 27 ♀♀
Romania	1 sample:	3 ☿☿, 1 ♀
Russia near Moscow	1 sample:	3 ☿☿
S Poland	1 sample:	2 ☿☿

Samples from the "Königshainer Berge" near Görlitz/Germany have been labelled as paratypes and are stored in SMNG: 1 km N Biesig bei Reichenbach, 1988-04-16; Ullersdorf bei Niesky, 1987-04-12; Ullersdorf/Kr Niesky, 1989-07-27; Königshain, Liebstein, 1988-05-05; Limasberg bei Liebstein/Kr Görlitz, 1989-08-10; Königshain, 1988-08-14; Königshain-West, 1989-07-30; Königshain W, 1989-07-29; 1 km N Königshain, Kr Görlitz, 1989-08-01.

3.2.2 Description

☿ (Fig 6, 7): Caput comparatively broad; ratio HL/HW on average 1.036 and significantly reducing with growing caput size, being 1.008 for HL = 1120 and 1.071 for HL = 800. This highly significant allometry can be described by the regression: $HL/HW = -0.00019335\ HL + 1.2251$ ($r = -0.6775$, $n = 113$). Occipital margin of caput, in the position where maximum HL is measured, notably excavated in larger specimens; this character is less clear or lost in smallest ☿☿. Clypeus, except its most frontal and caudal portions, normally with a carina; whole clypeus having a less bowed, more straight profile and more plane surfaces compared to *niger*. Dorsal profile line of mesosoma, less curved and with less steep dorsal dome of propodeum compared to *niger* (compare Fig 7 and 8). This is an average difference but not generally reliable for distinction. Dorsal crest of petiole scale in frontal view weakly emarginated; in smallest ☿☿ this character may be lost or inversed. Pubescence on whole body surface not very dense, giving a more shining appearance compared to *niger*. The pubescence interspaces are most clearly figured by PDCL being larger than 19 µm in 93 % of all specimens. All surfaces of caput and gaster, dorsum of mesosoma, scapus, coxae, all tibiae and all femora with numerous erect to suberect hairs which are on average longer than in each other European species of *Lasius* s. str. PNHL and UHL show isometric growth in a regression against HL; as weighted measure for hair length can be used therefore simple ratios with averages being 0.130 for UHL/HL and 0.159 for PNHL/HL. Whole body uniformly blackish brown. Pedes a little lighter coloured, scapus yellowish brown. The samples from different geographical origins do not deviate notably in their morphological data, which are presented in Tab 1.

♀ (Fig 3, 9): Pubescence on caput and mesosoma subdecumbent and moderately dense; the larger interspaces between pubescence hairs compared to *niger* are best reflected by PDCL which is larger than 14.7 µm. All surfaces of caput, dorsum of mesosoma, whole surface of gaster, coxae, femora, tibiae and scapus with numerous suberect to erect hairs which are in all positions distinctly longer than in *L. niger*. Petiolar scale more or less deeply emarginated. Mesosoma clearly flatter than in *niger*, ratio AH/AL in 98 % of ♀♀ below 0.561 (compare Fig 2 and 3). HW, AL and other absolute measurements on average lower than in *niger*. Morphological data are given in detail in Tab 2. Colour of all body parts uniformly blackish brown, scapus and legs paler.

Tab 2: Morphometric data of ♀♀ of *Lasius platythorax* n. sp., *L. niger* (Linnaeus 1758) and *L. emarginatus* (Olivier 1791) from S Sweden, E Germany, S Poland and Czechoslovakia [Hymenoptera: Formicidae].

	Arrangement of data		arithmetic mean standard deviation		(lower extreme-upper extreme) number of examined specimens	
	Lasius platythorax n. sp.		*Lasius niger*		*Lasius emarginatus*	
HL	1384.3 29.5	(1340–1443) 34	1431.9 41.1	(1331–1527) 35	1444.0 40.0	(1366–1526) 17
HW	1565.7 39.3	(1498–1639) 33	1619.9 49.0	(1505–1746) 35	1587.4 34.7	(1525–1659) 17
HL/HW	0.885 0.0194	(0.855–0.931) 33	0.884 0.0133	(0.854–0.914) 35	0.910 0.0213	(0.862–0.938) 17
SL/HL	0.856 0.0206	(0.809–0.902) 34	0.851 0.0177	(0.811–0.888) 35	0.892 0.0185	(0.861–0.935) 17
SL/HW	0.758 0.0254	(0.708–0.815) 34	0.752 0.0154	(0.724–0.786) 35	0.811 0.0174	(0.767–0.841) 17
AL	2794.4 89.3	(2535–2974) 66	3013.4 115.0	(2688–3244) 119	2929.5 123.7	(2718–3207) 17
AH/AL	0.527 0.0201	(0.478–0.567) 66	0.598 0.0163	(0.557–0.632) 119	0.479 0.0990	(0.454–0.492) 16
PDCL	24.50 7.90	(14.7–54.2) 66	11.23 1.45	(8.7–14.7) 120	29.26 7.46	(22.8–50.5) 17
PNHL	191.5 8.93	(172–218) 40	167.4 11.1	(140–188) 35		
nHS	24.56 7.81	(8–43) 34	21.26 6.70	(11–41) 34	18.36 8.32	(5–35) 17
nHHT	29.56 6.55	(19–43) 34	23.88 5.25	(12–37) 34	27.82 9.56	(9–43) 17

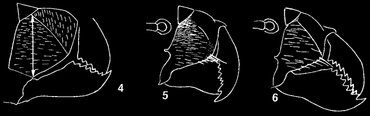


Fig 4: Mode of measuring pubescence distance on clypeus in ♀♀ and ☿☿ of *Lasius niger* (Linnaeus 1758) and *Lasius platythorax* n. sp. (the double arrow indicates the counting/measuring line) [Hymenoptera: Formicidae].
Fig 5–6: Pubescence distribution on the clypeus of ☿☿. — **5** *Lasius niger* (Linnaeus 1758). **6** the same for *L. platythorax* n. sp. [Hymenoptera: Formicidae].

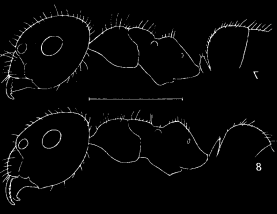


Fig 7–8: Pilosity distribution in lateral profile of ☿☿. — **7** *Lasius platythorax* n. sp., **8** *Lasius niger* (Linnaeus 1758) [Hymenoptera: Formicidae].

3.3 Differential diagnosis of Lasius platythorax n. sp. and Lasius niger

There are at least 8 species of *Lasius* s. str. in Europe. 5 of these (*L. brunneus* and 4 species with ☿☿ of *Lasius alienus*-complex morphology, that have almost hairless scapus and tibiae) can not be confused in the female castes with the 2 species described here. Among the *Lasius* with hairy scapus and tibiae from continental Europe, only *L. emarginatus* is known which is somewhat similar. In ☿☿, *L. emarginatus* differs from *platythorax* by significantly larger ratios SL/HL, SL/HW, HL/HW and shorter pubescence hairs on frons of caput: 10–23 µm in *emarginatus* against 22–35 µm in *platythorax*. Further, the Central European populations of *L. emarginatus* have consistently bicoloured ☿☿ with light reddish mesosoma which is a good means of separation from *platythorax* and *niger* in Central Europe (these colour differences are obscured in S Europe). The ♀♀ of *emarginatus* differ from those of *niger* additionally in having significantly larger SL/HL, SL/HW, PDCL, UHL/HL and shorter pubescence hairs on frons of caput: 10–23 µm against 22–35 µm. The ♀ of *emarginatus* may sometimes be less easy to separate from those of *platythorax*, but the larger SL/HL, SL/HW and lower AH/AL, as well as the more reddish brown colour and the flatter, less bowed scapus in *emarginatus* should normally enable a safe determination. The separation of *emarginatus* ♀♀ from *niger* is simply given either by their much flatter mesosoma or the much larger PDCL.

Looking around for possible senior synonymies of *platythorax* n. sp., several names regarded by Wilson [1955] as synonyms of *Lasius niger* must be considered. *Lasius niger* var. *alieno-niger* Forel 1874 can not be interpreted because there are no types available in Lausanne and Geneva and since the original description does not allow conclusions on identy of this name. However, Forel's statement "reduced pilosity on scapus and tibiae" makes *alienoniger* unlikely to be a synonym of *platythorax*. It could be either a weakly pilose *niger* or one of the *alienus*-like species or even a hybrid between a hairless and hairy species.

3 ☿ type specimens of *Lasius niger flavescens* Forel 1903 from near Bukhara, Central Asia, differ from *platythorax* in having a bright yellowish color, a more elongated caput, a convex lateral clypeal profile, a less developed clypeal carina and a more shining cuticular surface. These characters and the surely striking habitat differences make *flavescens* unlikely to be a synonym of *platythorax*.

Lasius niger emeryi Ruzsky 1905 from the Pamirs ("... hairs on scapus and tibiae sparse, short and oblique; reddish yellow alitrunk..."), *Acanthomyops niger alienus* var. *pilicornis* Kuznetzov-Ugamsky 1927 from Zailiski Ala Tau Mountains near Alma Ata, Central Asia ("... very few subdecumbent scapus hairs, body color uniformly yellowish-brown, dorsum of caput a little darker...") and *Acanthomyops niger nitidus* Kuznetzov-Ugamsky 1927 from West Tian Shan mountains near Lake Bakhman-Kul and upper Ugam river, 2000 m ("... head and alitrunk sparsely covered with fine subdecumbent hairs and shining...") can not be regarded as synonyms of *platythorax* according to morphology. Further, the ecological conditions which may be expected for the type localities are not adequate for *platythorax* n. sp. (see following section). However, in case of Kuznetzov-Ugansky's taxa, a reliable interpretation will never be possible because all his *Lasius* types are lost (Dlussky pers comm) and his descriptions enable no decisions on synonymy with the many species having either *emarginatus*-, *alienus*- or *niger*-like characters.

The Berlin type ♀♀ of *Lasius emarginatus* var. *nigrescens* Stitz 1930 from the Pamirs are strikingly different from *platythorax* in several characters and again the ecological argument is applicable. To state only one big morphological difference, the *nigrescens'* scapus ratios are much larger than the upper extreme known for *platythorax*.

Lasius transylvanica Röszler 1943 from Nyárádtö, Romania, is certainly no synonym of *platythorax* concluded from Röszler's description (floodplain habitat and the hairless tibiae). It could be a less pilose *niger* or one of the species with *alienus* characters. Röszler's type collection was probably lost at the end of the Second World War.

Lasius niger var. *grandis* Forel 1909 from Ronda, Malaga Espagna, is definitely different from *platythorax*. 5 type ☿☿ of *grandis* from Ronda have lower hair numbers on scapus and tibiae, shorter pronotal and gular hairs, a more convex clypeus with less clear carina, a more dense mesosoma and caput pubescence, larger SL/HW and the general surface appearance of the whole ant is much more smooth.

Acanthomyops niger var. *minimus* Kuznetzov-Ugansky 1928 from near Vladivostok, Soviet Maritime Territory, can not be interpreted because of insufficient description ("very small") and lack of types.

Certainly no synonym of *platythorax* n. sp. is the polygyneous and polycalic *Lasius sakagamii* Yamauchi & Hayashida 1970 from Japan. The character combination of 3 samples with 9 ☿☿ differs clearly from the *platythorax* condition. The most deviating character means are: HL/HW 1.076 (for HL = 975), SL/HL 1.004, SL/HW 1.081, nHS 31.7, UHL/HL 0.100, PDCL 15.73 (compare the *platythorax* data in Tab 1).

Lasius hayashi Yamauchi & Hayashida 1970 from Japan is a woodland species, and so it seems to be ecologically similar to *platythorax*. However, the morphological characters given in the original description generate no suspicion on synonymy of *hayashi* and *platythorax*. *L. hayashi* is described to have a very different color pattern, a less hairy scapus, a shorter caput (HL/HW 1.00), a shorter scapus (SL/HW 0.95) and seems to be larger (Yamauchi & Hayashida give a mean HL of 1.06 mm and a range of 0.96–1.21 mm).

Lasius emarginatus var. *japonicus* Santschi 1941 from Tokiawa, Hokaido, is very different from *platythorax* in color, shape and morphometric characters. 5 ☿☿ of the *japonicus* lectotype series have the arithmetic

means HL 1022, SL/HW 1.023, UHL/HL 0.088, PNHL/HL 0.136 and only 2–8 standing hairs on underside of caput where *platythorax* has always more than 20.
An investigation of the lectotype and paralectotype of *Lasius niger coloratus* Santschi 1937 from Musha/Formosa revealed striking differences to *platythorax* in color and structures. *Lasius coloratus* has much shorter and more oblique scapus hairs, definitely larger HL/HW, SL/HL and SL/HW, much lower UHL/HL and a rather dull dorsum of caput because of more developed microsculpture. *L. coloratus* should be considered as good species related to *emarginatus* and is no synonym of *Lasius productus* Wilson 1955.

The separation is possible between European material of *Lasius platythorax* n. sp. and *niger* in each of the 500 ☿☿ studied with the stereo-microscope. A combined consideration of the characters UHL/HL, PNHL/HL and PDCL always enabled a safe determination of single ☿☿; of course possible damage such as torn-off pubescence hairs or partially cut setae have to be considered. With a simple 20× lens, a distinction of *niger* and *platythorax* is possible for a trained observer even in the field if several ☿☿ per nest are scrutinized. One sample from Hall. Väderö/Sverige contain ☿☿ with doubtful hair length data (UHL/HL 0.106, PNHL/HL 0.134) but PDCL was 12.1 which is much smaller than the lower extreme of *platythorax*, and so the species identity of this sample is not in question.
Except for 3 malformed specimens, the distinction of other 119 *niger* and 66 *platythorax* ♀♀ is almost unproblematic using the character combination PDCL × AL/AH which resulted in a perfect separation (see Fig 9). *L. niger* had lg (PDCL × AL/AH) of 1.274 ± 0.055 (n = 119, 1.128–1.403) and *platythorax* had 1.665 ± 0.120 (n = 66, 1.452–1.987). If these characters fail, the shorter average hair length of *niger* ♀♀ on the whole body can be used as additional means for separation.

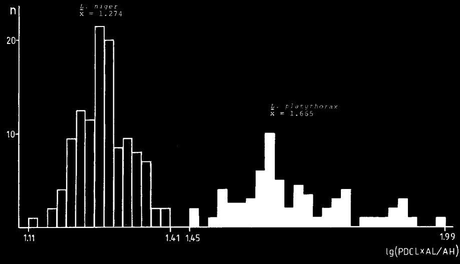


Fig 9: Frequency distribution of the index lg (PDCL × AL/AH) in ♀♀ of *Lasius platythorax* n. sp. and of *Lasius niger* (Linnaeus 1758) [Hymenoptera: Formicidae].

4 Ecological, geographical and behavioural evaluation

4.1 Habitat selection and geographical distribution

There is a very pronounced habitat segregation between *Lasius niger* and *platythorax* in E Germany from Mecklenburg south to the Erzgebirge. This enables in many cases a subsequent interpretation of the species identity of literature records of "*Lasius niger*" if there are statements on the habitat. Tab 3 shows the number of nests collected in different habitat groups of E Germany during the years 1978–1989. These data are not corrected in respect of biased choice of study areas but they reflect in any case the striking differences between the 2 species. According to Schoeners' formula [Schoener 1974], a very small habitat overlap of 0.058 is calculated with the data of Tab 3. Only *platythorax* is present inside forests, having here mean densities of 6.8 nests/100 m^2 (extreme 22.7 nests/100 m^2) as found on 7 test plots. Only *platythorax* is present in bogs or fens, with mean nest densities of 4.0/100 m^2 (extreme 15.0/100 m^2) as computed from 10 test plots. In the latter habitats, the lowest densities of *platythorax* were recorded in the wettest parts, the floating Sphagnetalia, with moisture figures of 9 [Seifert 1986]. In 3 such test plots *platythorax* was not found, and in a fourth it had 0.7 nests/100 m^2 only. Much higher *platythorax* densities were recorded in bog areas with less extreme moisture, particularly if trees were present providing dead wood as a suitable nest site. Not found in bogs, *Lasius niger* clearly predominates in all other kinds of open, more or less xerothermous habitats, in urban areas and in open agricultural land. If *niger* is found in woodland at all, then these sites are sunny areas such as clearings or bare, exposed rocks. Conversely *L. platythorax* may exceptionally be found in small tree groups in agriculatural land.

Tab 3: Distribution of 99 *Lasius platythorax* n. sp. and 323 *Lasius niger* (Linnaeus 1758) nests over several habitat groups from Germany [Hymenoptera: Formicidae].

	L. platythorax	*L. niger*
Bogs and fens	36	0
Coniferous and deciduous forests (except their very margins to open land or clearings)	46	0
The very margin between forest and open land	12	9
Open xerothermous habitats (dry and semi-dry grasslands, open habitats on rock, open sandy heath, margins of motor highways)	3	104
Arable land (stable, grassy margins between ploughed areas)	0	42
Pavements, trotoirs and ground walls of houses in urban areas	0	38
Gardens in villages, suburbs and cities	0	78
Salinas	0	3

It is of particular interest that dealate colony-founding ♀♀ of *platythorax* were frequently collected in typical *niger* habitats, but succesful nest foundations were observed as rare exceptions in these sites. This is very likely due to eradication in initial stage by *L. niger.* In contrast, a dealate foundress of *niger* has not been collected inside a forest. If not a sampling error, this should indicate a difference in orientation mechanisms after mating, with *niger* ♀♀ moving

to open areas only and *platythorax* ♀♀ orienting to both woodland and open areas. Obviously, *niger* is preferentially bound to all kinds of open cultural habitats where it may reach extremely high densities; up to 108 nests/100 m^2 were observed in grassy margin strips of arable land on black soil, and a mean density of 22.1 nests/100 m^2 was recorded for 24 test plots in open cultural habitats of differing structure. All above data were taken from investigations presented earlier [Seifert 1986] plus 6 additional test plots.
One of the most important factors directing the habitat selection of Central European ants is soil moisture [Seifert 1986]. Tab 4 shows the numbers of *platythorax* and *niger* nests found in habitats with the soil moisture classes 1–9. These numbers could not be corrected for the asumption that soil moisture is supplied along the total range with equal frequencies for each class as done elsewhere [Seifert 1986, 1987], because in these nest numbers are summed up data from test plots as well as data from many point studies. Note that moisture class 6 is underrecorded while class 8 is overrecorded because of special search in boggy habitats. If biased or not, these distributions show in any case that *L. niger* avoids wet or moist places and prefers dryer places than *platythorax*. In other geographical latitudes a certain change of habitat preferences may be expected. In S Sweden, *L. platythorax* seems to colonize, more than in central Europe, open sun-exposed places; and the only ☿ of *L. niger* from S Bulgaria was collected in a shadowy woodland. It is still not clear which of the 2 species occurs in Fennoscandia north to the line reported by Collingwood [1979] as northern border for *"Lasius niger"* which is about at 66° N and follows approximately the 14.7 °C July isotherm. From the distribution of species such as *Myrmica schencki*, *Tetramorium*, *Lasius alienus*, *Formica cinerea*, *F. nigricans* or *Polyergus*, which are all distinctly more xerothermous than *L. niger*, and which all occur in Sweden north to Uppland at least, it may be expected with a high probability that *L. niger* and *L. platythorax* are sympatric in Linnaeus' putative terra typica in Uppland and farther north.

Tab 4: Numbers of nests of *Lasius niger* (Linnaeus 1758) and of *L. plathythorax* n. sp. [Hymenoptera: Formicidae] found at spots with soil moisture classes according to Seifert [1986]. Note that biased sampling has underrecorded moisture class 6 and overrecorded class 8.

soil moisture	1	2	3	4	5	6	7	8	9	total
Lasius niger (mean moisture: 3.66 ± 0.86)	5	24	84	179	28	2	2	—	—	323
Lasius platythorax (mean moisture: 5.72 ± 2.12)	—	5	16	12	15	4	12	26	5	99

4.2 Behavioural differences

Tab 5 illustrates striking differences between *L. niger* and *platythorax* in the mode, location and material of nest construction. However, one may argue with good reasons that these differences are not necessarily an expression of a different selective behaviour of the ants but simply the reflection of the changing supply of materials and microhabitats between the macrohabitats preferred by each species (Tab 3). Therefore it is of interest to consider the situation at the very margin lines between forest and open land where both species coexist at the same spot. At such places is observed at least one difference which is a behavioural one: *L. niger* preferentially builds its characteristic, often very conspicuous mound with mineralic soil

material. *L. platythorax*, if it has nests in some kind of elevated, mound-like microhabitat, then they are not constructed with mineralic soil particles but are almost always excavated in the humous root layer of grass tussocks or bults. So it can be pointed to *L. platythorax* as a preferential excavator of diverse organic materials, and *L. niger* as a digger and above-ground constructur with mineralic soil particles. It is only *L. niger* that has been seen to construct the well-known "highways", partially sheltered or completely roofed by thin, fragile walls of soil particles; and it is only *L. niger* which constructed mineralic soil walls to cover aphid colonies at the basal parts of vegetation. Of course, soil ejections may be noted at *platythorax* nests sometimes (as in many other soil dwelling ants) but these ejections are never ordered in some kind of construction. Inside the nests, *platythorax* builds walls with organic material or soil particles. *L. niger* may sometimes excavate rotten stumps of trees or dead wood when colonizing clearings. Its tendency to construct mounds is always conspicuous but lowers with increasing insolation of soil surface, increasing occurrence of big surface stones and growing mechanical stress on the soil surface. In the contact zones of both species at margin lines, interspecific aggression was noted, but this issue remains to be studied in future.
The daytime and conditions for nuptial flight of *platythorax* are unknown. For *L. niger*, it typically swarms on hot or warm afternoons or evenings with high air humidity, and it has also been caught in light traps at night. The dates of occurrence of alate ♀♀ (not of ♂♂!) were recorded inside the nests or from just swarming ones. For Central Europe, *L. platythorax* was found to have a little earlier period than *L. niger*: the mean date was the 16 July ± 18.9 days (n = 13, 11 vi – 8 vii) in *plytathorax*, and the 27 July ± 16.0 days (n = 38, 29 vi –3 ix) in *niger*. The colonies of *platythorax* are often less populous than in *niger* but it should be tested whether this difference is caused by habitat-depending feeding and temperature conditions or by genetically determined laying capacity.

Tab 5: Nest types of 88 *Lasius platythorax* n. sp. and 88 *L. niger* (Linnaeus 1758) nests [Hymenoptera].

	L. platythorax	*L. niger*
In dead wood	48	3
Under stones	11	33
In vegetation pads with Sphagnum	12	0
In litter	2	0
In grass tussocks with humous root layer	12	0
Soil nests without mound	3	22
Mounds of mineralic soil particles	0	30

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Middlekauff, W. W.: **A Revision of the Sawfly Family Orussidae for North and Central America (Hymenoptera: Symphyta, Orussidae).** — In: Case, T., Chemsak, J., Doyen, J., Hespenheide, H., Miller, T. A., Pinto, J., Powell, J., Pipa, R., Shapiro, A., & Thorp, R. (Editorial Board), University of California Publications in Entomology, Vol. 101. — [IX + 46 pages, 54 figures, size 178×252 mm, soft cover]. — Publisher: University of California Press, Berkeley - Los Angeles - London; ISBN: 0-520-09683-5; price: US $ 8.75. ——— [EGR-Nr 925].

The systematics for 9 species of 4 genera are given consisting of a) a key to the species, b) a description of the known stages and c) lists of records. 1 genus with 1 species and 2 further species are new to science. The new genus Ophrynon is based on 1 ♀ and is close to Ophrynopus. In the key it appears under this genus and that might be correct. In addition to the systematics a short review on the biology and ecology of the larvae and on adult behavior is given, showing that very little is known of the larvae living as parasitoids. Rudolf Abraham (Hamburg)

Sermonti, G. (Editor): **Rivista di Biologia/Biology Forum.** Vol. 81-4. — [623 pages, numerous figures, tables and photographs, size: 170×240 mm, soft cover. Publisher: CIC Edizioni Internationali s.r.l., Rome; ISSN: 0035-6950; price: $ 30.—. ——— [EGR-Nr 1662].

Leon Croizat und seiner **Panbiogeographie** sind fast 200 Seiten dieses Rivista di Biologia Bandes (457—621 pp) gewidmet. Kennt man Croizats ideenreiche Werke über „Manual of Phytogeography" (1952), über „Panbiogeography" (1958) oder „Space, Time, Form" (1964) nicht, lohnt es sich, das Buch mit dem Schlußkapitel zu beginnen. Das von Jonathan Baskin bereits 1974 in Caracas aufgenommene Interview verdeutlicht nämlich besser als jede von anderen Autoren vorgenommene Panbiogeographie-Analyse den wissenschaftstheoretischen Standort von Croizat. Deutlich wird, daß er sich zumindest zum damaligen Zeitpunkt noch nicht mit den Argumentationsmustern der Phylogenetischen Systematik ernsthaft auseinandergesetzt hatte, und daß ihn — auch auf seinem speziellen Forschungsgebiet den Euphorbiaceen — taxonomische Einheiten auf Spezies- und Subspezieslevel nur aus klassifikatorischen Gründen interessierten. „You must call a certain plant by a certain name, a certain animal by a certain name". Biogeographie war für ihn zunächst einmal die auf Familien- und Ordnungsniveau darstellbaren chorologischen Strukturmuster der Biosphäre. Deren z. T auffallende Konstanz ließ ihn zu der Überzeugung kommen, daß die für Darwin und Wallace als Barrieren der terrestrischen Biota wirksamen Ozeane viel stärker zur Verwandtschaftsindikation heranzuziehen sind, als es die Biogeographie vor A. Wegener ahnen konnte.

Verfolgt man nach diesem Interview die Argumentationsmuster der Kollegen zum wissenschaftlichen Stellenwert des Werkes von Croizat, wobei vorausgeschickt werden muß, daß diese, ausnahmslos aus Neuseeland bzw Hawaii kommend, naturgemäß schon immer Probleme mit den traditionellen Erklärungsversuchen von Darwin und Wallace hatten, so fällt auf, daß sie die Bedeutung des Werkes von Croizat fast ausschließlich durch eine retrospektive Analyse von durch zunehmende Information naturgemäß veralterten Thesen älterer Autoren herausarbeiten. Das wird besonders deutlich bei Grehan (p. 469—498 ‚Panbiogeography: evolution in space and time'): „In place of restricted centers of origin and casual migration, Croizat suggested that distributions evolve as a direct spatiotemporal function of ancestral ranges. The ancestor if formerly distributed over an area wider than the individual ranges of its immediate descendants. In Darwin and Wallace's biogeography, oceans were treated as barriers between biogeographic regions. In the panbiogeographic synthesis it is the ocean basins which define the biogeographic relationships of animal and plant distributions". Wie aber die Panbiogeographie zur Arealgenese des „Ancestors" kommt, wird verschwiegen. Genau diesen Widerspruch arbeiten Craw und Heads (p. 499—532: „No text, no phrase or word can be reduced to a single meaning") heraus, ohne daß ihre Erkenntnisse allerdings bei den konkreten Arealanalysen von Climo (Analyse der neuseeländischen Punctidae; p. 533—551) oder Chiba (Arealanalyse des Lepidopterengenus Choaspes in Südostasien) zu wesentlich tieferen Erkenntnissen führen würden als „Darwinism, or neo-Darwinism as it came to be known, is not wrong, it is just conceptually incomplete". Ihre Argumentationen bleiben letztlich ebenso angreifbar, wie der auf Craw (1988) rückführbare Versuch Grehans (p. 569—576) die biogeographische Zonierung der Erde neu zu ordnen (Pazifik, Atlantik, Indik, Arktik und Südregion). „The biogeographic regions proposed by Wallace and his successors do not exist as parts of the real, natural world. They are only artefacts of present-day geography. Orientation of distributions to ocean basins introduces a novel concept of spatio-temporal centers of origin". „Distribution are either separated by, or centered on and around particular ocean basins", denkt Grehan weiter bei der Verbreitungsanalyse der Ratiten und von Nothofagus (p. 577—588). Wie recht er hat! Aber das wissen wir doch schon seit langem, genauso wie wir wissen, daß auch Croizat ohne die „Center of dispersal-Theorie" nicht auskommt, wenn er seiner Gründerpopulation ein für spätere Ableitungen möglichst großes Areal zuordnet. Ohne „Dispersal" ist das nicht möglich, und es wird weiter deutlich, daß chorologische und geologische Methoden für sich genommen nicht ausreichen, um die Plesio- oder Apochorie von Arealtypen zu erkennen. Letztlich gehört dazu eine Verknüpfung der Inhalte, wie sie z B mit den Methoden der Synapomorphie-Analyse möglich wird.

Der wirkliche Verdienst von Croizat beruht deshalb darin, daß er durch seine Überlegungen, die Dominanz eines Erklärungsmechanismus auf Normalmaß zurückgeführt hat. Vielleicht hätte diese Erkenntnis auf weniger Seiten dargestellt werden können, ohne daß damit deren Unterhaltungswert gering geachtet werden soll.

Paul Müller (Saarbrücken)